

Draft elements on possible consensus recommendations in relation to the clarification, consideration and development of aspects of the normative and operational framework on emerging technologies in the area of lethal autonomous weapons systems

Revised Chair's paper – 20 September 2021

This paper is submitted under the responsibility of the Chair. The following are elements for discussion for possible inclusion in the report of the GGE, which will be prepared at a later stage. This paper does not prejudice the outcome of the 2021 GGE session, or the course of the discussion to follow.

(1) Introduction

- 1.** Recall the objectives and purposes of the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects (hereinafter “the Convention”),
- 2.** Recognize the Convention as an appropriate framework for consideration of emerging technologies in the area of lethal autonomous weapons systems, including the need to clarify, consider and develop aspects of the normative and operational framework,
- 3.** Recall the guiding principles, the work on the legal, technological and military aspects and the conclusions of the Group of Governmental Experts related to emerging technologies in the area of lethal autonomous weapons systems, as reflected in its reports of 2017, 2018 and 2019, which were the basis for the clarification, consideration and development of aspects of the normative and operational framework on emerging technologies in the area of lethal autonomous weapons systems.
- 4.** Recognize the risks and challenges posed by emerging technologies in the area of lethal autonomous weapons systems, including in ensuring respect in all circumstances for the rules and principles of international law, including international humanitarian law and international human rights law, as well as for ethical considerations and in the maintenance of international peace and security,
- 5.** Recognize also the potential for emerging technologies in the area of lethal autonomous weapons systems to be used in upholding compliance with international humanitarian law and other applicable international legal obligations, including by, inter alia, incorporating autonomous self-destruct, self-deactivation, or self-neutralization mechanisms into munitions and weapon systems; increasing awareness of civilians and civilian objects on the battlefield; improving assessments of the likely effects of military operations; increasing the speed,

precision and accuracy of weapons systems; and reducing the need for immediate fires in self-defense,

6. Affirm that a normative and operational framework on emerging technologies in the area of lethal autonomous weapons systems must strike a balance between military necessity and humanitarian considerations,

7. Affirm that a normative and operational framework on emerging technologies in the area of lethal autonomous weapons systems must also address ethical considerations, including in relation to upholding human dignity, retaining human agency and upholding moral responsibility and accountability for decisions to use force,

(1) Characterizations

(a) A weapon system may be characterized as autonomous if it can, through the use of sensors, computers and algorithms, perform the critical functions of selecting and engaging to apply force against targets without intervention by a human operator or without permanent human involvement or control.

(b) Fully autonomous weapons systems are autonomous weapon systems that are designed to operate outside a responsible chain of human command and control.

(c) Partially autonomous weapons systems are autonomous weapon systems that are designed to operate within a responsible chain of human command and control.

(d) Weapons systems that incorporate autonomy only into functions other than to select and engage to apply force against targets cannot be characterized as autonomous weapons systems.

(2) Application of international law

1. International law, including the Charter of the United Nations, international humanitarian law, international human rights law and international criminal law applies fully to all weapons systems, in particular the development and use of autonomous weapons systems.

2. In cases not covered by the Convention and its annexed Protocols or by other international agreements, the civilian population and the combatants shall at all times remain under the protection and authority of the principles of international law derived from established custom, from the principles of humanity and from the dictates of public conscience.

3. The development and use of weapons systems based on emerging technologies in the area of lethal autonomous weapons systems must be conducted in accordance with applicable international law, in particular international humanitarian law and its requirements and obligations and principles, including *inter alia* distinction, proportionality and precautions in attack and the protection of persons hors de combat.

4._____These international humanitarian law requirements, obligations and principles must be applied through a responsible chain of human command and control by the human operators and commanders who use weapons systems based on emerging technologies in the area of lethal autonomous weapons systems, including autonomous weapons systems.

5. Context-based human judgement and control based on consideration of all information available at the time of the decision is essential in order to ensure that the potential use of autonomous weapons systems is in compliance with international law, and in particular international humanitarian law.

6._____Compliance with the international humanitarian law rules and principles, including inter alia distinction, proportionality and precautions in attack, in the potential use of weapons systems based on emerging technologies in the area of lethal autonomous weapons systems requires inter alia that human beings make certain judgements in good faith based on their assessment of the information available to them at the time.

State and human responsibility

7. International humanitarian law imposes obligations on States, parties to armed conflict and individuals, not machines.

8. States, parties to armed conflict and individuals remain at all times responsible for adhering to their obligations under applicable international law, including international humanitarian law. States must also ensure individual responsibility for the employment of means or methods of warfare involving the potential use of weapons systems based on emerging technologies in the area of lethal autonomous weapons systems in accordance with their obligations under international humanitarian law.

9. Under principles of State responsibility, any internationally wrongful act of a State or attributable to a State, including such acts involving the use of emerging technologies in the area of lethal autonomous weapons systems, entails the international responsibility of that State.

10. A State remains responsible for, inter alia, all acts committed by its organs including members of its armed forces, including any such use of emerging technologies in the area of lethal autonomous weapons systems, in accordance with applicable international law.

11. Human responsibility for decisions on the use of weapons systems must be retained since accountability cannot be transferred to machines. This should be considered across the entire life cycle of the weapons system.

Human accountability

12. Humans must at all times remain accountable in accordance with applicable international law for decisions on the use of force.

13. Accountability for the development, deployment and use of autonomous weapons systems, including through the operation of such systems within a responsible chain of human command and control remains with States.

14. States must ensure accountability for any wrongful act involving any weapon system used by the State's forces in armed conflict in accordance with applicable international law, in particular international humanitarian law.

15. States must ensure that algorithm-based programming do not rely on data sets that can perpetuate or amplify social biases, including gender and racial bias, and that can thus have implications for compliance with international law.

16. The following general practices help ensure accountability in military operations, including operations involving the use of emerging technologies in the area of lethal autonomous weapons systems:

- (a) Conducting operations under a responsible chain of command and control.
- (b) Subjecting members of the armed forces to a system of military law and discipline.
- (c) Establishing and using procedures for the reporting of incidents involving potential violations.
- (d) Conducting assessments, investigations, or other reviews of incidents involving any potential wrongful acts.

17. The following practices with respect to the use of weapons systems, including those based on emerging technologies in the area of lethal autonomous weapons systems, can help ensure accountability in military operations:

- (a) Rigorous testing of and training on the weapon system, so commanders and operators understand the likely effects of employing the weapon system.
- (b) Establishing procedure and doctrine applicable to the use of the weapon system, which provide standards and limits for commanders and operators on responsible use and under which they can be held accountable under the State's domestic law.
- (c) Using the weapon system in accordance with established training, doctrine, and procedures and refraining from unauthorized uses or modifications of the weapon system.

Implications

18. Not to develop, produce, acquire, possess, deploy or use fully autonomous weapons systems.

19. Not to use any type of autonomous weapons system if it is of a nature to cause superfluous injury or unnecessary suffering, or if it is by nature indiscriminate, or is otherwise

incapable of being used in accordance with the rules and principles of international humanitarian law.

20. Not to use any type of autonomous weapons system that cannot perform their functions in accordance with the intention of a human operator and commander to comply with rules and principles of international humanitarian law, including inter alia the principles of distinction, proportionality and precautions in attack.

21. To maintain sufficient human control over partially autonomous weapons, to ensure conformity with international humanitarian law and to satisfy ethical considerations. The use of such weapons should be regulated through measures such as:

- (a) Limits on the types of target, such as constraining them to objects that are military objectives by nature;
- (b) Limits on the duration, geographical scope and scale of use, including to enable human judgement and control in relation to a specific attack;
- (c) Requirements for human–machine interaction and timely intervention and deactivation.

(3) Human-machine interaction

1. Human-machine interaction, which may take various forms and be implemented at various stages of the life cycle of a weapon, should ensure that the potential use of autonomous weapons systems is in compliance with applicable international law, in particular international humanitarian law. In determining the quality and extent of human-machine interaction, a range of factors should be considered, including the operational context, and the characteristics and capabilities of the weapons system as a whole.

2. Human control over the use of autonomous weapons systems can be exercised in various ways across the life-cycle of these weapon systems and through human-machine interaction.

3. The phases of the life-cycle of a weapon system include: political direction in the pre-development phase; research and development; testing, evaluation and certification; deployment, training, command and control; use and abort; post-use assessment; decommissioning.

4. As referred to in Section 2, paragraph 21 above, sufficient human control requires that:

- (a) Humans make informed decisions about the deployment and use of weapons.
- (b) Humans have sufficient information to ensure that force is used in accordance with international law, given what they know about the potential target, the capabilities and characteristics of the weapon to be used, and the operational context in which the weapon is deployed.

(c) The weapon is tested in a realistic operational environment, and humans are properly trained, to ensure that the weapon is deployed in a lawful manner.

5. Identify good practices for human-machine interaction, including such practices identified in academic research or developed in industry, that can be shared on a voluntary basis to strengthen compliance with international humanitarian law when using autonomous weapons systems.

(4) Weapon reviews

1. In accordance with States' obligations under international law, in the study, development, acquisition, or adoption of a new weapon, means or method of warfare, determination must be made whether its employment would, in some or all circumstances, be prohibited by international law.

2. All States that have not yet done so are encouraged to consider joining Additional Protocol I to the Geneva Conventions of 12 August 1949.

3. Legal reviews, at the national level, in the study, development, acquisition or adoption of a new weapon, means or method of warfare are a useful tool to assess nationally whether potential weapons systems based on emerging technologies in the area of lethal autonomous weapons systems, including autonomous weapons systems, would be prohibited by any rule of international law applicable to that State in all or some circumstances.

4. The following elements of practice can be applied in the conduct of legal reviews, at the national level, in the study, development, acquisition, or adoption of autonomous weapons systems:

(a) States should consider key challenges in the regulation and nature of the systems through a regular evaluation process based on a set of criteria relevant for autonomous weapons systems.

(b) A weapon system under development or modification which significantly changes the use of existing weapons systems, must be reviewed as applicable to ensure compliance with international humanitarian law.

(c) New concepts or operational contexts for the employment of existing weapons should be reviewed, when such concepts or operational contexts differ significantly from the authorized uses that were considered when those systems were previously reviewed or that may result in different effects.

(d) The legal review should consider whether the weapon is of a nature to cause superfluous injury or unnecessary suffering, or if it inherently indiscriminate, or is otherwise incapable of being used in accordance with the requirements and principles of IHL.

(e) Analyzing whether a weapon is “inherently indiscriminate,” should consider whether the weapon is capable of being used in accordance with the principles of distinction and proportionality.

(f) In considering whether a weapon system is consistent with the prohibitions against weapons of a nature to cause superfluous injury or unnecessary suffering or against weapons that are by nature indiscriminate, it may be useful to compare the weapon system to existing weapons systems not falling under these prohibitions.

(g) In light of the particular challenges of autonomous weapons systems, including potential for self-learning that could introduce a risk of unpredictability, weapons reviews should be conducted with a full understanding of the weapons’ capabilities and limitations, in light of its normal or expected uses and sufficient confidence about its effects in those circumstances.

(h) Persons conducting the legal review should understand the likely effects of employing the weapon in different operational contexts. Such expectation should be produced through realistic system developmental and operational test and evaluation.

5. Where feasible and appropriate, inter-disciplinary legal, military and ethical perspectives must be integrated in research and development of autonomous weapons systems, including through independent ethics reviews bearing in mind national security considerations and restrictions on commercial proprietary information.

6. States are encouraged to identify, adopt and implement guidelines and to share, on a voluntary basis, information and good practice on the conduct of legal reviews of autonomous weapon systems.

(5) Risk mitigation

1. When developing or acquiring emerging technologies in the area of lethal autonomous weapons systems, including autonomous weapons systems, consider physical security, appropriate non-physical safeguards, including cyber-security against hacking or data spoofing, the risk of acquisition by terrorist groups and the risk of proliferation.

2. Risk assessments and mitigation measures should be part of the design, development, testing and deployment cycle of emerging technologies in any weapons systems, including autonomous weapons systems.

(a) The risks, inter alia, of civilian casualties, as well as precautions to help minimize the risk of incidental loss of life, injuries to civilians and damage to civilian objects must be considered. Other types of risks should be considered, as appropriate, including but not limited to the risk of unintended engagements, risk of loss of control of the system, risk of proliferation and risk of acquisition by unauthorized users, including terrorist groups.

(b) Risk mitigation measures can include rigorous testing and evaluation of systems, legal reviews, readily understandable human-machine interfaces and controls, training personnel,

establishing doctrine and procedures, and circumscribing weapons use through appropriate rules of engagement.

3. Where feasible and appropriate, verifiability and certification procedures covering all likely or intended use scenarios must be developed, the experience of applying such procedures should be shared bearing in mind national security considerations or commercial restrictions on proprietary information.

4. Prevent the diversion of autonomous weapons systems to unauthorized users, by adopting appropriate measures at the national level in order to regulate production, acquisitions and transfers.

(6) Operational aspects

1. Adopt the appropriate legal, administrative and other measures.

2. Exchange national policies, experiences and good practices on a voluntary basis.

3. Avoid hampering progress in or access to peaceful uses of technologies, taking into account the dual use nature of the technology underlying autonomous technologies.